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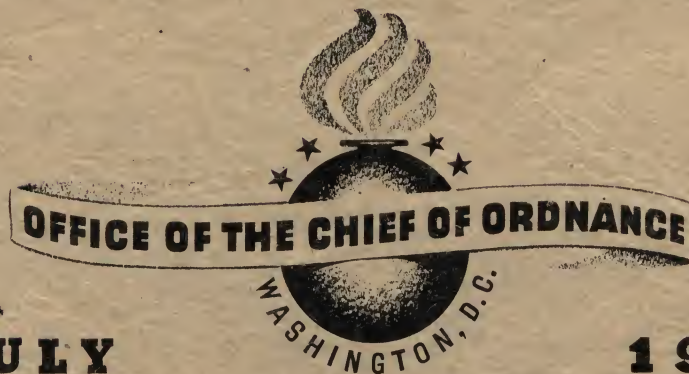
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DATE: ~~-----~~ **Lt. Col., Ord. Corps.**

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4 APR 1942

ANTITANK WEAPONS



JULY

1944

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INTRODUCTION

Antitank

This booklet contains a brief description of the principal weapons and types of ammunition which have been standardized, placed under production and made available to troops in quantity for the defeat of enemy armored fighting vehicles. While several more powerful antitank weapons and ammunition are under development, they are not included, since these items are not yet available to troops.

For convenience the more important characteristics of the weapon are given with special emphasis upon the armor penetrating power of the ammunition.

All armor piercing ammunition above 40 mm in caliber now being manufactured, known as "A.P.C.", is equipped with an H.E. base charge and a base detonating fuze. The fuze is timed to permit the projectile to pass through the thickest plate which the projectile can penetrate at the most unfavorable angles of obliquity and to burst the projectile in rear of the plate or inside of the vehicle to insure the destruction of the vehicle and its personnel. To make the low velocity weapons, such as the 75 mm Howitzer, effective against armored vehicles, special hollow charge ammunition, known as "H.E., A.T." has been designed. This ammunition gives very great relative penetration and has the advantage that the same penetration can be obtained at all ranges at which the tanks can be hit and for any inclination of the armor plate up to 60°. Tests and battle experience have shown that this ammunition is very effective in setting fire to a tank. The 2.36" Antitank Rocket and the Antitank Rifle Grenade are both of the hollow charge type and have proven to be very effective against armor up to 4" in thickness.

In combating tanks, weapons which have the potential power of penetrating tank armor should be considered in addition to the antitank weapons specifically designed for this purpose. For example, the 75 mm gun on page 29 is capable of penetrating the side and rear armor of all German tanks due to the fact that the airplane speed increases the velocity of the A.P.C. projectile. Under favorable tactical situations, this airplane with the 75 mm gun, is an important antitank weapon.

Likewise, the 90 mm antiaircraft gun carriage, M2, which can be fired directly from the wheels and has shields for the protection of the gun crew, is a most effective antitank gun.

All types of Corps and Army artillery are effective against tanks. The fire control equipment for artillery weapons has been designed to meet antitank requirements. For example, the 155 mm Howitzer, M1, with its heavy projectile, is effective against all types of German tanks. If high explosive ammunition is fired from artillery weapons against tanks, the fuzes should be set "delay" to obtain the best effect.

INFANTRY WEAPONS



Rifle Grenade M9A1

RIFLE GRENADES

Rifle Grenade, A.T., M9A1 uses the hollow charge principle and is capable of penetrating 3 to 4 inches of homogeneous armor plate when impact is normal to the surface. Best results are obtained when the grenade strikes within 20 degrees of normal.

The body of the grenade contains a charge of 4 ounces of pentolite.

Hits in vulnerable areas of tanks are sufficient to cause neutralization of action. The sides and backs of tanks are the principal areas of vulnerability but hits scored on tracks, bogies, vision slits, air louvers, guns, periscopes, sponson floor plates, or at the junction of the turret and hull are also effective.

In firing the M9A1 from the M1 rifle (with M7 launcher), the M1903 rifles (with M1 launcher), and the M1917 rifle (with M2 launcher) the rifle grenade cartridge M3 and the auxiliary grenade cartridge M7 only must be used. Service ammunition must not be used with the grenades. The auxiliary grenade cartridge M7 is used, in addition to the grenade cartridge M3, when increased ranges are desired or opportunities for more accurate point blank low angle fire present themselves. Rifle Grenade Sight M15 is employed on rifles equipped with grenade launchers.

To fire the M9A1 Grenade from the several models of carbines (using the M8 Launcher) the Grenade Cartridge M6 only must be used.

120	30	4	3
135	45	4	3
150	30	3	2
165	45	3	2
180	30	2	1
200	45	2	1
210	30	1	—
230	45	1	—
255	45	None	None
226	15	None—Plus Aux. Grenade Cart. M7	None—Plus Aux. Grenade Cart. M7
278	20	"	"
315	25	"	"
344	30	"	"
379	35	"	"
401	40	"	"
365	45	"	"

RANGE TABLE—Carbines

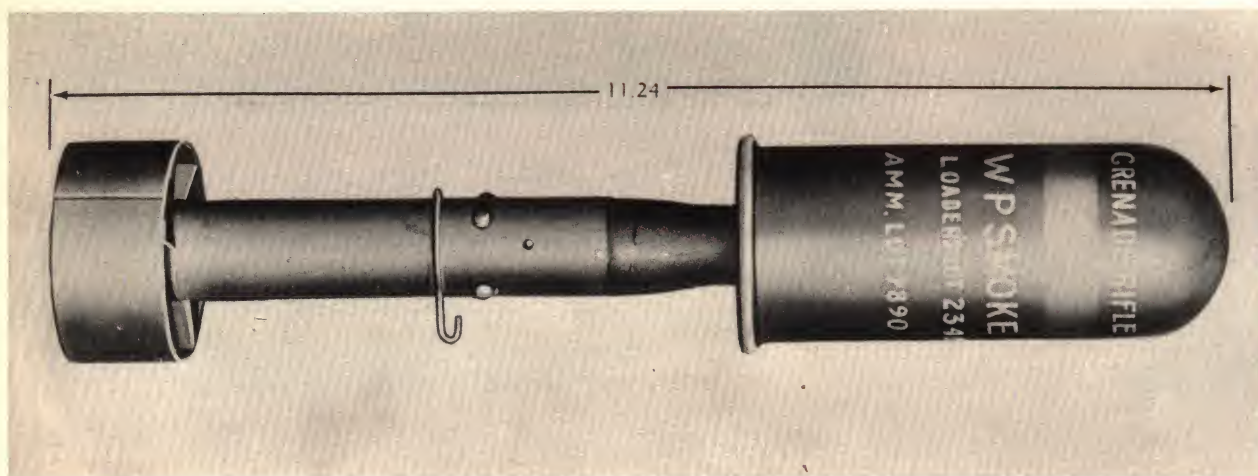
Range Yards	Angle of Elevation (Degrees)	Launcher Position (No. of Rings Exposed)
50	30	6
55	45	6
70	30	5
80	45	5
95	30	4
110	45	4
115	30	3
130	45	3
135	30	2
150	45	2
170	45	1
185	45	None

RANGE TABLE—Rifles

Range Yards	Angle of Elevation (degrees)	Launcher Position (No. of rings exposed)	
		M1 Rifle (M7 Launcher)	M1903 Rifles (M1 Launcher) M1917 Rifle (M2 Launcher)
70	30	6	5
80	45	6	5
90	30	5	4
105	45	5	4

CHARACTERISTICS

Weight.....	1.31 lb.
Length.....	11.24 in.
Explosive charge wt.....	4 oz.
Explosive charge.....	Pentolite



Smoke Rifle Grenade (WP) M19

WHITE PHOSPHOROUS (WP)

Verbal reports from the theaters of operations indicate many instances where crews have abandoned their tanks when white phosphorous smoke was introduced by way of the ventilating systems. Smoke emitted by white phosphorous projectiles will also prevent the enemy tank crew from observing the attacking weapon. Projectiles containing white phosphorous should be aimed at vision slits, open turrets on gun motor carriages, and grills over engines.

The employment of white phosphorous grenades in this manner is not in itself capable of permanently stopping tanks. However, tanks thus immobilized provide easy targets for antitank weapons or may even be captured by ground forces.

The Grenade, Rifle, Smoke (WP) M19 is a bursting type smoke grenade containing 8.5 ounces of white phosphorous. When the bursting charge is detonated the material is sprayed over an area of approximately 25 yards radius.

The grenade cartridge M3 is used for firing this grenade from all caliber .30 rifles with appropriate launchers. For firing from carbines (with M8 launchers) the grenade cartridge M6 only is used. When longer ranges are necessary the auxiliary grenade cartridge M7 may be employed in conjunction with the M3 grenade cartridges when fired from rifles M1903, M1917 and M1.

RANGE TABLES—Rifles

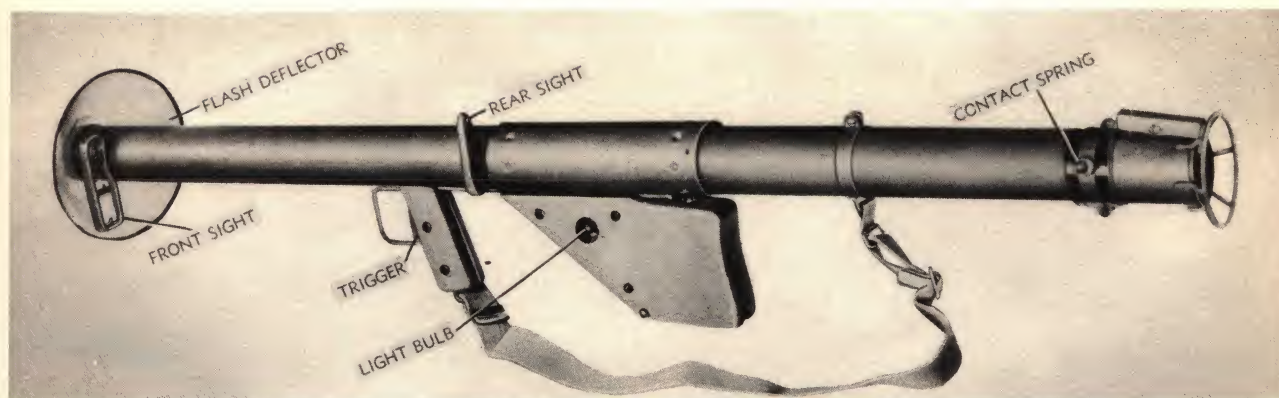
Range Yards	Angle of Elevation (degrees)	Launcher Position (No. of rings exposed)	
		M1 Rifle (M7 Launcher)	M1903 Rifle (M1 Launcher) M1917 Rifle (M2 Launcher)
55	30	6	5
60	45	6	5
85	45	5	4
110	45	4	3
135	45	3	2
165	45	2	1
195	45	1	—
215	45	None	None
285	30	None-Plus	None-Plus
310	45	Aux. Grenade	Aux. Grenade
260	60	Cart. M7	Cart. M7

RANGE TABLE—Carbines

Range Yards	Angle of Elevation (Degrees)	Launcher Position (No. of Rings exposed)
40	45	6
65	45	5
85	45	4
100	45	3
120	45	2
135	45	1
150	45	None

CHARACTERISTICS—Rifle Smoke Grenade (WP), M19

Weight	1.5 lb.
Length	11.24 ins.
Filler	White phosphorous
Weight of filler	8.5 ounces



2.36 inch Rocket Launcher M1A1—left side view



2.36 inch Rocket Launcher M9A1

ROCKET LAUNCHERS - 2.36"

The 2.36 inch rocket launchers M1A1 and M9A1 ("bazookas") are shoulder weapons designed especially for antitank purposes. They are powerful supporting arms which may be used both offensively and defensively.

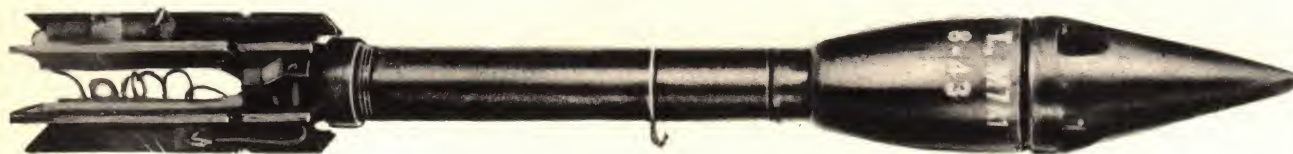
Field reports state that the "bazooka" has been very effective against tanks and other armored vehicles. The latest model, M9A1, is a two piece launcher which may be carried by paratroopers or airborne infantry.

The muzzle velocity of these weapons is 265 feet per second.

	M1A1	M9A1
Weight.....	14 lb.	16 lb.
Length.....	54.5 ins.	61 ins.
Elevation.....	45° max.	45° max.
	No minimum limit	No minimum limit
Maximum effective range.....	100-200 yds. crossing field of fire	100-200 yds. crossing field of fire
	400-500 yds. approaching or fixed targets	400-500 yds. approaching or fixed targets
How fired.....	From shoulder	From shoulder
Firing mechanism.....	Electric	Electric
Rate of fire (approx.)....	10 rds. per min.	10 rds. per min.



2.36 inch H.E., A.T. Rocket M6A1



2.36 inch Practice Rocket M7A1

ROCKETS - 2.36"

The rockets M6A1, M6A2, and M6A3 are 2.36 inch high-explosive, hollow-charge rockets which are propelled by jet action of their propellant charge. Detonation is effected by action of a simple inertia striker fuze mechanism.

While the round is extremely effective at any range within its limits it is so deadly against tanks that it is advisable to use it at ranges not greater than 75 yards, where it is impossible to miss the target.

At all ranges the M6A1 and M6A2 will penetrate 3 inches of armor plate at angles of impact as great as 30 degrees from the normal. The M6A3 will penetrate, at all ranges, 4 inches of armor plate at angles of impact as great as 50 degrees from the

normal. A hole approximately one inch in diameter is blown through the armor plate and particles of the projectile and the armor plate, heated to incandescence, are blown from the inside of the plate in a cone of roughly 90 degrees. Any ammunition within this cone is usually exploded.

CHARACTERISTICS

	M6A1	M6A2	M6A3
Weight.....	3.4 lb.	3.4 lb.	3.4 lb.
Length.....	21.6 in.	21.6 in.	19.4 in.
Muzzle velocity..	265 f/s	265 f/s	265 f/s
Type of head....	H.E., A.T.	H.E., A.T.	H.E., A.T.
Booster.....	Tetryl	Tetryl	Tetryl
Wt. of explosive filler.....	0.5 lb.	0.5 lb.	0.5 lb.
Wt. of propellant.	61.5 grams	61.5 grams	61.5 grams



Light Antitank Mine T7

LIGHT ANTITANK MINE T7

The Light Antitank Mine T7 is intended primarily for hasty security for individuals and small units. It is extremely compact and light in weight. Portability is its most important characteristic.

The Light Antitank Mine T7 is quite effective against wheeled vehicles and with standard firing devices and fuzes is capable of being used as an antipersonnel mine, as a heavy blast grenade, and for the reduction of bunkers and pillboxes.

As an antitank weapon the mine is usually emplaced or concealed on the ground or slightly below the surface, singly or in groups of two or more. One

mine will usually sever tank tracks and effectively immobilize wheeled vehicles. When the mine is completely covered by the tank track it will usually shear off the bogie suspension mechanism of the Medium Tank.

CHARACTERISTICS

Weight.....	4¼ lbs.
Explosive Charge.....	3¼ lb. tetrytol
Mine body material.....	Sheet metal (Terne plate)
Maximum stream emplacement.....	2 ft. of water
Blast resistance to adjacent mines.....	5 ft.
Operating load.....	250 ± 50 lbs.

ANTITANK GUNS



37 mm Gun M3A1 on Carriage M4A1, showing gas deflector no longer used on this gun

37 MM GUN M3A1 ON CARRIAGE M4A1

The 37 mm Gun M3A1 on Carriage M4A1 is the lightest mobile artillery piece in the United States Army. Designed as an antitank weapon, it weighs less than 1,000 pounds. Using high explosive and armor-piercing ammunition, it is effective against all types of light mechanized equipment, but maximum effectiveness of this gun against tanks will be obtained at ranges of less than 500 yards. The ease with which it can be manipulated makes it particularly suitable for use against moving targets. This gun is employed for direct fire only, and is constructed for one-man control of aiming, elevating, traversing, firing and loading.

CHARACTERISTICS

Weight of Gun and Carriage in traveling position	912 lb.
Muzzle velocity {	
Shell, H.E., M63	2,600 f/s
Shot, A.P.C., M51B2	2,900 f/s
Canister M2	2,500 f/s
Range permitted by maximum elevation {	
Shell, H.E., M63	7,200 yd.
Shot, A.P.C., M51B2	9,575 yd.

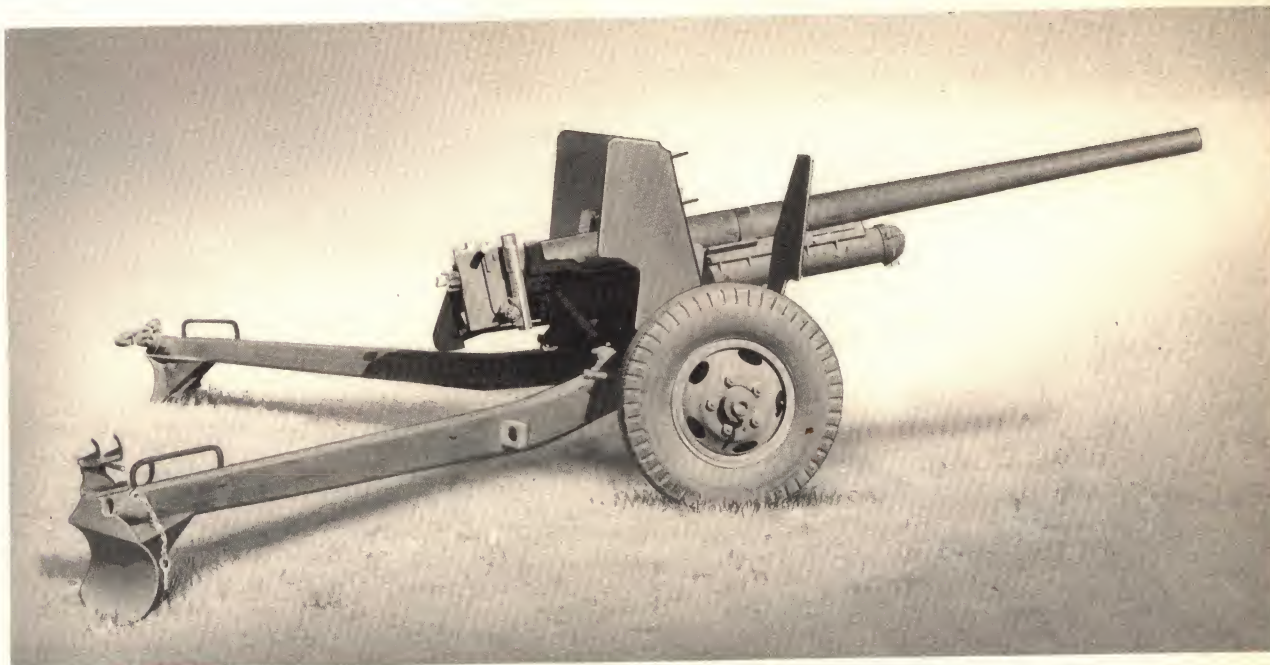
Elevation	-10° to +15°
Traverse (free)	60° (30° Rt., 30° Lft.)
How fired	From wheels or segments
Rate of fire	15 to 20 rds. per min.
Time to emplace	1½ min.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M63	1.61 lb.	.44 lb.	3.03 lb.
Shot, A.P.C., M51B2	1.92 lb.	.57 lb.	3.41 lb.

ARMOR PENETRATION—Shot, A.P.C., M51B2

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2550	2.7 in.	2.2 in.	2.5 in.	1.9 in.
1000	2290	2.3 in.	1.9 in.	2.1 in.	1.7 in.
1500	2100	2.0 in.	1.6 in.	1.9 in.	1.5 in.
2000	1930	1.8 in.	1.5 in.	1.7 in.	1.4 in.
3000	1600	1.4 in.	1.1 in.	1.3 in.	1.0 in.



57 mm Gun M1 on Carriage M1, in firing position. 57 mm Gun Carriage M1A3 is Carriage M1 with minor modifications

57 MM GUN M1 ON CARRIAGE M1A3

The 57 mm Gun M1 was designed as a light weight antitank weapon capable of greater armor penetration than the 37 mm gun. Rapid direct fire laying of the gun on fast moving targets is facilitated by free traverse.

Elevation..... -5° to $+15^{\circ}$
 Traverse (free)..... 90° (45° Rt., 45° Lft.)
 How firedFrom wheels or segments
 Rate of fire.....20-30 rds. per min.
 Time to emplace..... $1\frac{1}{2}$ min.

CHARACTERISTICS

Weight of Gun and Carriage in traveling position.....2,915 lb.
 Muzzle velocity { Shot, A.P., M70.....2,970 f/s
 Projectile, A.P.C., M86.....2,700 f/s
 Range permitted { Shot, A.P., M70.....6,955 yd.
 by maximum elevation { Projectile, A.P.C., M86.....9,840 yd.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shot, A.P., M70	6.28 lb.	2.25 lb.	12.92 lb.
Projectile, A.P.C., M86	7.27 lb.	2.25 lb.	13.73 lb.

ARMOR PENETRATION

Range Yards	Striking Velocity A.P., M70 f/s	A.P.C., M86 f/s	Homogeneous Plate 0° Obliquity		30° Obliquity		Face Hardened Plate 0° Obliquity		30° Obliquity	
			A.P., M70	A.P.C., M86	A.P., M70	A.P.C., M86	A.P., M70	A.P.C., M86	A.P., M70	A.P.C., M86
500	2500	2510	4.3 in.	3.9 in.	3.4 in.	2.8 in.	3.6 in.	4.2 in.	3.0 in.	3.0 in.
1000	2080	2320	3.4 in.	3.5 in.	2.6 in.	2.6 in.	2.7 in.	3.8 in.	2.2 in.	2.7 in.
2000	1390	1960	1.8 in.	2.8 in.	1.5 in.	2.0 in.	1.5 in.	3.0 in.	1.2 in.	2.1 in.
4000	860	1310	1.0 in.	1.6 in.	.7 in.	1.1 in.	.8 in.	1.7 in.	.7 in.	1.2 in.



3-inch Gun M5 on Carriage M6, in firing position

3-INCH GUN M5 ON CARRIAGE M6

The 3-inch Gun M5 on Carriage M6 was designed as a high power antitank weapon. While this gun is primarily assigned missions involving direct fire, it can also be used for indirect fire. Capable of being towed at high speeds, this weapon is equipped with handspikes, ratchet handles to apply torque to the wheels and a caster wheel to facilitate man handling for short distances. With A.P.C. ammunition this gun is capable of immobilizing the heaviest enemy tanks.

CHARACTERISTICS

Weight of gun and carriage in traveling position	5,870 lb.
Muzzle velocity	<div> <div>Shell, H.E., M42B1</div> <div>Projectile, A.P.C., M62 or M62A1</div> </div> <div> <div>2,800 f/s</div> <div>2,600 f/s</div> </div>
Range permitted by maximum elevation	<div> <div>Shell, H.E., M42B1</div> <div>Projectile, A.P.C., M62 or M62A1</div> </div> <div> <div>13,950 yd.</div> <div>15,300 yd.</div> </div>
Elevation	-5° to +30° 13'

Traverse	45° (22½° Rt., 22½° Lft.)
How fired	From wheels or segments
Rate of fire	Short bursts—15 to 20 rds. per min. Prolonged—5 rds. per min.
Time to emplace	3 min.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M42B1	12.87 lb.	4.57 lb.	24.91 lb.
Projectile, A.P.C., M62 or M62A1	15.44 lb.	4.62 lb.	27.23 lb.

ARMOR PENETRATION—Projectile, A.P.C., M62 or M62A1

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2450	4.9 in.	3.9 in.	5.1 in.	4.1 in.
1000	2300	4.5 in.	3.6 in.	4.7 in.	3.8 in.
2000	2000	3.7 in.	2.9 in.	3.9 in.	3.1 in.
4000	1460	2.3 in.	1.9 in.	2.5 in.	2.0 in.

MOBILE ARTILLERY



75 mm Pack Howitzer M1A1 on Carriage M1

75 MM PACK HOWITZER M1A1 ON CARRIAGE M1

The 75 mm Pack Howitzer M1A1 on Carriage M1 was designed for pack transport, animal draft and low speed towing. It is an effective weapon in jungle or mountainous terrain. Howitzer and carriage can be broken down into six loads for transportation on pack mules. The Carriage M1 has steel-tired wooden wheels that weigh 49½ pounds each. Spring equilibrators are set within the front trail section. Using the "hollow charge" round, H.E., A.T., M66, the 75 mm Howitzer M1A1 is an effective weapon against tanks at normal battle ranges.

CHARACTERISTICS

Weight of howitzer and carriage in traveling position	1,268 lb.
Muzzle velocity	Shell, H.E., M48 1,250 f/s
	Shell, H.E., A.T., M66 1,000 f/s
Maximum range	Shell, H.E., M48 9,610 yd.
	Shell, H.E., A.T., M66 7,900 yd.
Elevation	—5° to +45°

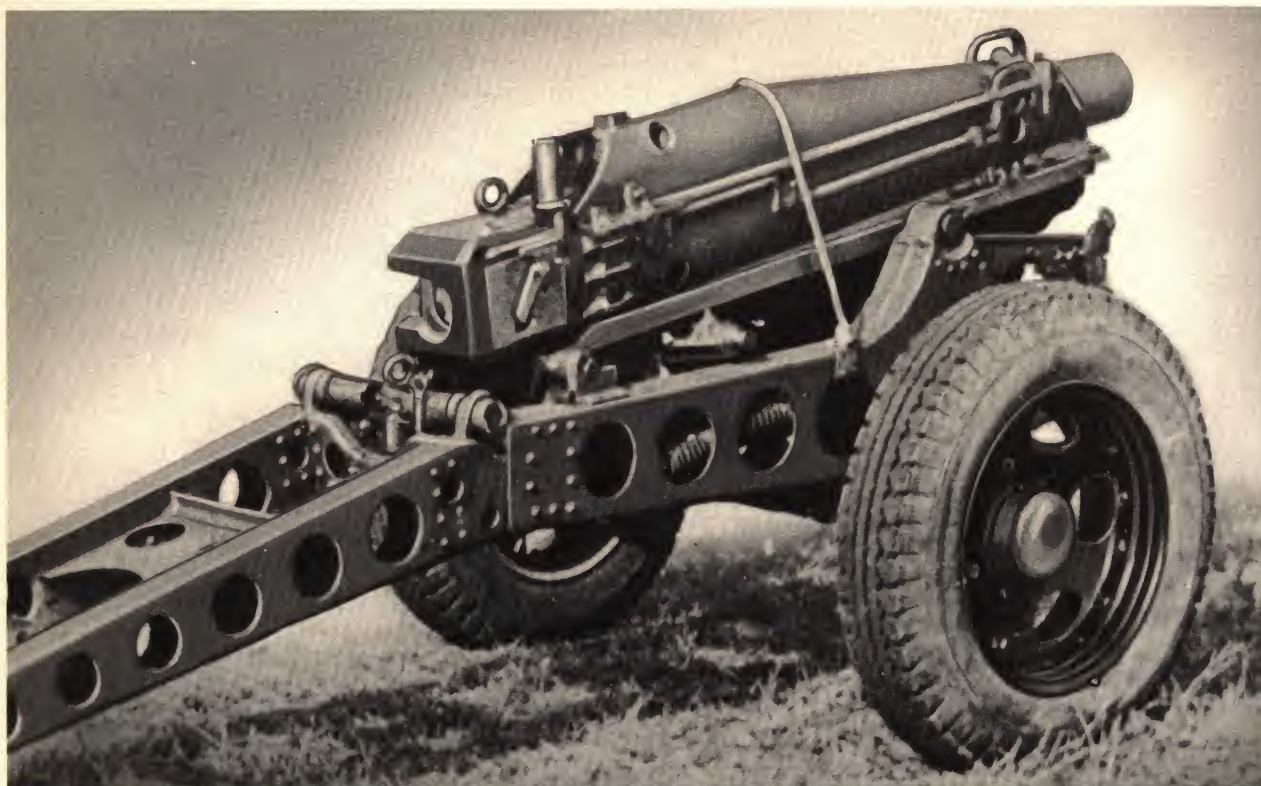
Traverse	6° (3° Right, and 3° Left)
How fired	From wheels
Rate of fire	6 rds. per min.
Time to emplace (from animal pack)	.3 min.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M48	14.70 lb.	.92 lb.	18.20 lb.
Shell, H.E., A.T., M66	13.27 lb.	.41 lb.	16.30 lb.

ARMOR PENETRATION—Shell H.E., A.T., M66

For both homogeneous and face hardened armor plate the penetration is between 3 and 4 inches for all angles of armor inclination from 0° to 60° at all ranges at which it is possible to hit the target.



75 mm Pack Howitzer M1A1 on Carriage M8

75 MM PACK HOWITZER M1A1 ON CARRIAGE M8

The 75 mm Pack Howitzer M1A1 on Carriage M8 was designed for use with airborne troops, being rapidly disassembled and assembled. It may be transported as a unit by airplane or glider or broken down into 7 paracrate loads for delivery by parachute. These loads include sighting and fire control equipment, with 2 additional loads for ammunition. The Carriage M8 is the same as the 75 mm Howitzer Carriage M1 except that the wooden wheels of the M1 are replaced by wheels with pneumatic tires. It also has a towing lunette and may be towed at speeds up to 20 miles per hour. With Shell H.E., A.T., M66, it can be used as an antitank weapon at normal ranges.

CHARACTERISTICS

Weight of howitzer and carriage in traveling position 1,339 lb.
 Muzzle velocity { Shell, H.E., M48..... 1,250 f/s
 Shell, H.E., A.T., M66..... 1,000 f/s
 Maximum range { Shell, H.E., M48..... 9,610 yd. (Charge A)
 Shell, H.E., A.T., M66..... 7,900 yd.

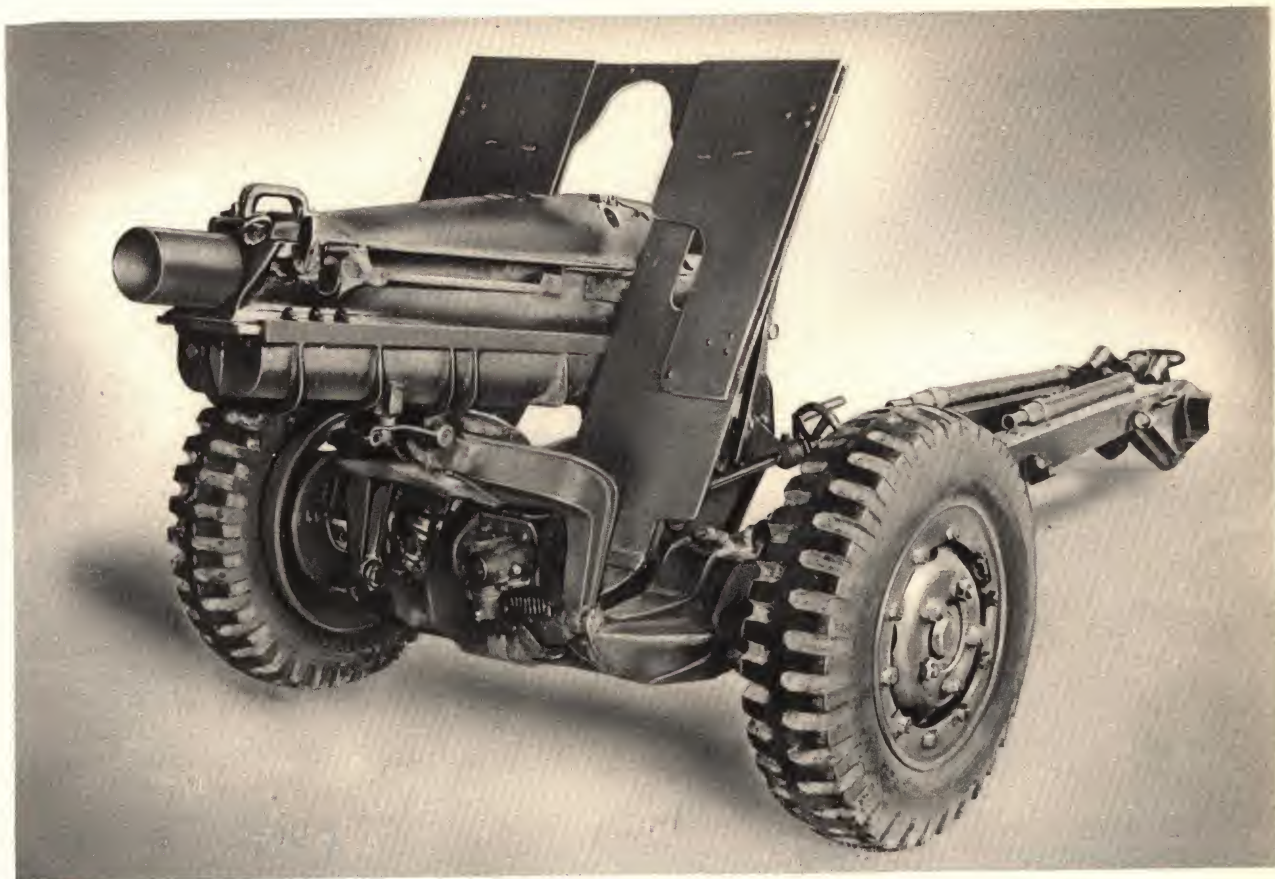
Elevation..... -5° to +45°
 Traverse..... 6° (3° Right and 3° Left)
 How fired..... From wheels
 Rate of fire..... 6 rds. per min.
 Time to emplace..... 3 min.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M48.....	14.70 lb.	.92 lb.	17.67 lb.
Shell, H.E., A.T., M66.....	13.27 lb.	.41 lb.	16.30 lb.

ARMOR PENETRATION—Shell, H.E., A.T., M66

For both homogeneous and face hardened armor plate the penetration is between 3 and 4 inches at all angles of armor inclination from 0° to 60° at all ranges at which it is possible to hit the target.



75 mm Pack Howitzer M1A1 on Carriage M3A3

75 MM PACK HOWITZER M1A1 ON CARRIAGE M3A3

The 75 mm Pack Howitzer M1A1 on Carriage M3A3 is a light artillery weapon of great mobility. The carriage M3A3 was designed for high speed towing and use with cavalry divisions. It has a split trail and pneumatic-tired disc wheels with divided rims which can be retracted to allow the carriage to rest on a firing base, thus, with the two trails, providing three-point ground support and giving excellent stability in firing. The carriage is equipped with shields. Employing Shell, H.E., A.T., M66 this howitzer can be used as a direct fire antitank weapon.

CHARACTERISTICS

Weight of howitzer and carriage in traveling position 2,159 lb.
 Muzzle velocity { Shell, H.E., M48 1,250 f/s
 { Shell, H.E., A.T., M66 1,000 f/s
 Maximum range { Shell, H.E., M48 9,610 yd. (charge 4)
 { Shell, H.E., A.T., M66 7,900 yd.
 Elevation -9° to +50°

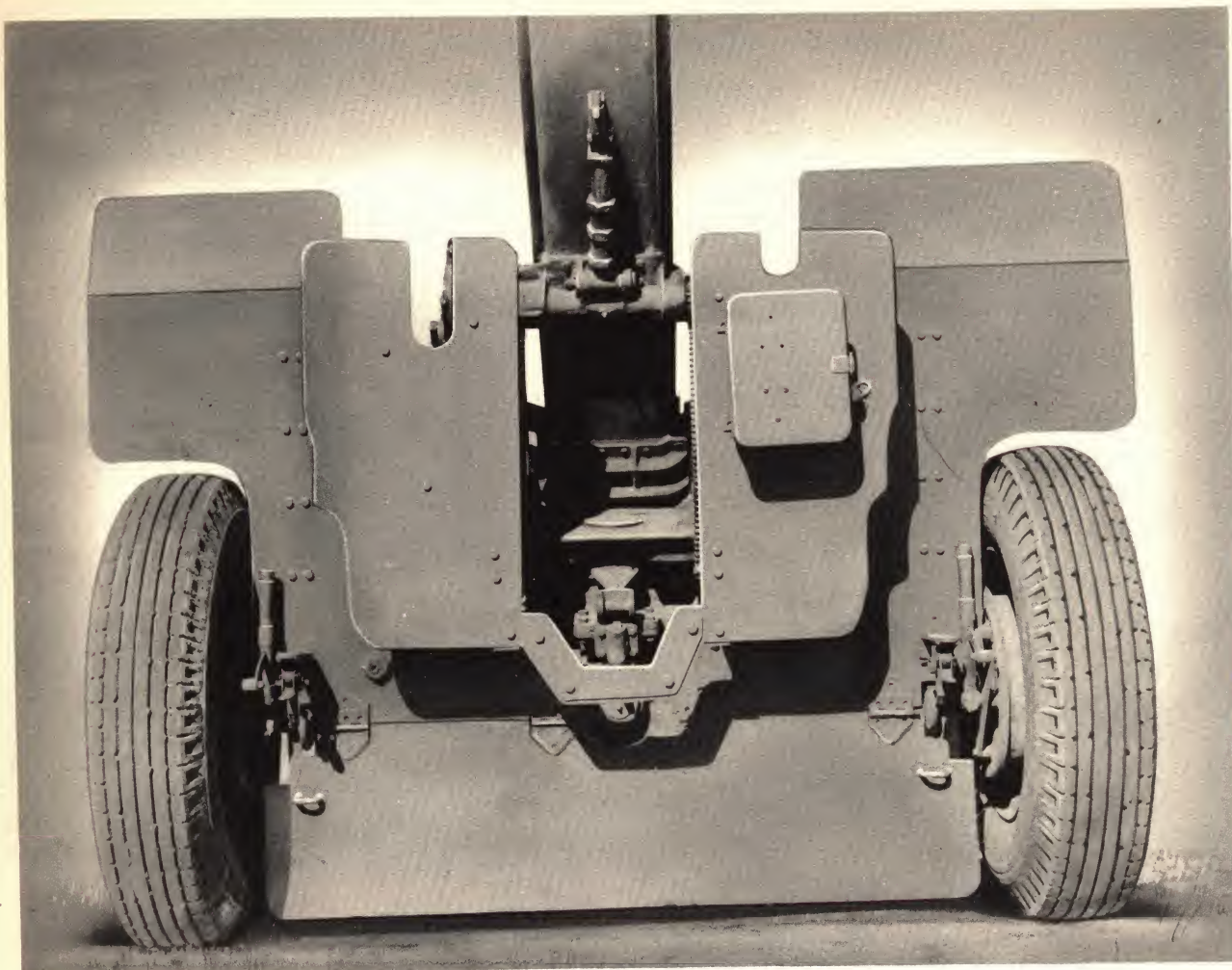
Traverse 45° (22½° Rt., 22½° Lft.)
 How fired From firing base
 Rate of fire 6 rds. per min.
 Time to emplace 3 min.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M48	14.70 lb.	.92 lb.	17.67 lb.
Shell, H.E., A.T., M66	13.27 lb.	.41 lb.	16.30 lb.

ARMOR PENETRATION—Shell, H.E., A.T., M66

For both homogeneous and face hardened plate the penetration is between 3 and 4 inches at all angles of armor inclination from 0° to 60° at all ranges at which it is possible to hit the target.



Rear view of 105 mm Howitzer M2A1 on Carriage M2A2

105 MM HOWITZER M2A1 ON CARRIAGES M2, M2A1, M2A2

The 105 mm Howitzer M2A1 on Carriage M2, M2A1, or M2A2 is an all-purpose weapon capable of effective employment with great accuracy against tanks, personnel, and all types of ground targets. Provided with split trails and pneumatic-tired wheels, it can be towed at speeds up to 35 miles per hour. The weapon is elevated and traversed manually, the elevating mechanism being operated from either side of the carriage. Both H.E. and H.E., A.T. ammunition are used in this howitzer. This howitzer is also mounted on 105 mm Howitzer Motor Carriages M7 and M7B1.

CHARACTERISTICS

Weight of gun and carriage in traveling position:

Carriage M2A1	4,475 lb.
Carriage M2A2	4,970 lb.
Muzzle velocity { Shell, H.E., M1	1,550 f/s
Shell, H.E., A.T., M67	1,250 f/s
Maximum range { Shell, H.E., M1	12,205 yd.
Shell, H.E., A.T., M67	8,590 yd.

Elevation	-4° 45' to +64° 15'
Traverse	45° (22½° rt., 22½° lt.)
How fired	From wheels
Rate of fire	4 rds. per min.
Time to emplace	3 min.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M1	33.00 lb.	2.94 lb.	42.07 lb.
Shell, H.E., A.T., M67	29.22 lb.	1.5 lb.	36.95 lb.

ARMOR PENETRATION—Shell, H.E., A.T., M67

For both homogeneous and face hardened plate the penetration is better than 4 inches at all angles of armor inclination from 0° to 60° at which it is possible to hit the target.



105 mm Howitzer M3 on Carriage M3A1

105 MM HOWITZER M3 ON CARRIAGES M3, M3A1, M3A2

The 105 mm Howitzer M3 on Carriages M3, M3A1 and M3A2 was especially designed for airborne transport, but its light weight, split trail, and pneumatic tired wheels also enable it to be towed at high speeds by a prime mover. Elevation and traverse are accomplished manually through the medium of handwheels. Either direct or indirect fire may be used. It is an effective weapon against tanks, personnel and other ground targets.

CHARACTERISTICS

Weight of howitzer and carriage in traveling position:

Carriage, M3A1 2,667 lb.

Carriage, M3A2.....3,010 lb.

Muzzle velocity	Shell, H.E., M1	1,020 f/s
	Shell, H.E., A.T., M67	1,020 f/s

velocity	Shell, H.E., A.I., M67.....	1,020 f/s
	1681 H.E., M41.....	7,520 f/s

Range permitted by maximum elevation	{	Shell, H.E., M1 7,500 yd. (Charge 5)
		Shell, H.E., A.T., M67 7,180 yd.

Elevation..... -9° to $+30^{\circ}$

Traverse.....	45° (22½° Rt., 22½° Lft.)
How fired.....	From firing base
Rate of fire.....	15 rds. per min.
Time to emplace.....	3 min.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M1	33.00 lb.	1.32 lb.	40.36 lb.
Shell, H.E., A.T., M67	29.22 lb.	1.2 lb.	36.65 lb.

ARMOR PENETRATION—Shell, H.E., A.T., M67

For both homogeneous and face hardened plate the penetration is over 4 inches at all angles of armor inclination from 0° to 60° at which it is possible to hit the target.



155 mm Gun, M1A1 on Carriage M1

155 MM GUN, M1A1 ON CARRIAGE M1

The 155 mm Gun M1A1 on Carriage M1 is a weapon of great fire power combined with high mobility. Provided with H.E. and A.P. ammunition, this gun is used primarily for attacking heavy fortifications, lines of communications and supply points. Its armor piercing characteristics, however, can be used to advantage against enemy tanks, although it should not be engaged in direct fire fights with rapid loading weapons at close range.

The sighting and fire control equipment provided with this weapon are of the typical Field Artillery type, permitting direct and indirect fire.

CHARACTERISTICS

Weight of gun and carriage in traveling position.....	30,600 lb.
Muzzle velocity .. Shell, H.E., M1O1..	2,800 f/s
.. Projectile, A.P.	
.. M112B1.....	2,745 f/s
Maximum range .. Shell, H.E., M1O1..	25,715 yd.
.. Projectile, A.P.,	
.. M112B1.....	24,075 yd.
Elevation.....	-1° 50' to +60°

Traverse.....	60° (30° Rt., 30° Left)
How fired	From bottom carriage as base
Rate of fire.....	1 rd. per. min.

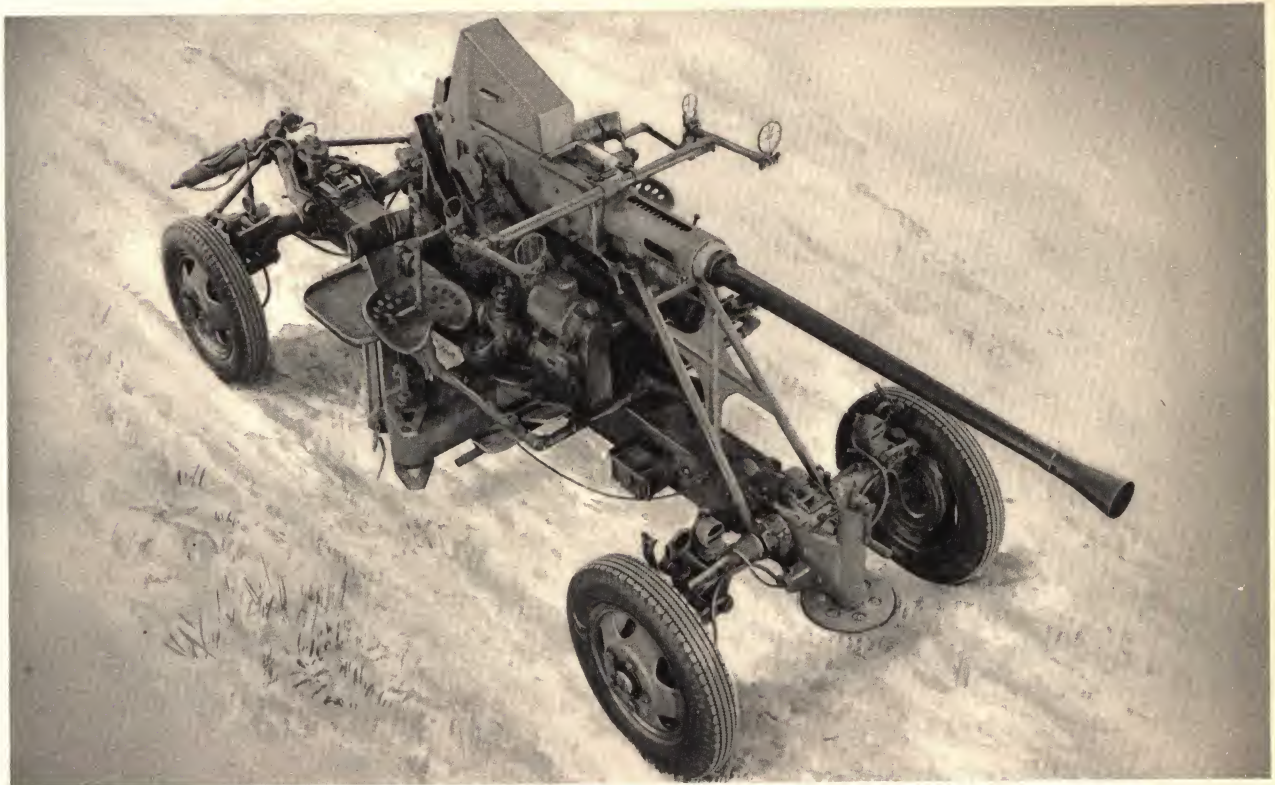
AMMUNITION

Type	Wt. of Projectile	Nominal Wt. of Propelling Charge	Approx. Wt. of Complete Round
Shell, H.E., M1O1 (Supercharge).....	95.00 lb.	31 lb.	126 lb.
Shell, H.E., M1O1 (Normal charge).....	95.00 lb.	21 lb.	116 lb.
Projectile, A.P., M112B1.....	100 lb.	31 lb.	131 lb.

ARMOR PENETRATION

Range Yards	Striking Velocity (f/s)	Homogeneous Plate 0° Obliquity	20° Obliquity
600	2650	7.7 in.	6.7 in.
1000	2585	7.5 in.	6.5 in.
2000	2420	6.8 in.	5.9 in.
4000	2100	5.5 in.	4.8 in.

ANTIAIRCRAFT ARTILLERY



40 mm Automatic Antiaircraft Gun M1 on Carriage M2A1—in traveling position

40 MM AUTOMATIC ANTI-AIRCRAFT GUN M1 ON CARRIAGE M2A1

The 40 mm Automatic Antiaircraft Gun, M1, is primarily designed for combating low flying airplanes and dive bombers, but the A.P. projectile provided for the weapon is also effective against tanks. Among the important features of the weapon are great accuracy and mobility, high rate of fire, and speedy transfer from traveling to firing position. As an antiaircraft weapon, the firing data are usually computed and the gun is elevated and traversed automatically by remote control. For anti-tank use, direct fire is usually employed and the weapon is elevated and traversed manually.

Elevation.....	—6° (carriage level), —11° (with jacks) to +90°
Traverse.....	360°
How fired.....	Wheels or jacks
Rate of fire.....	120–140 rds. per min. (usually fired in bursts of 4 or 5 rds.)
Time to emplace.....	Gun alone—2 min. W/FC equipment— 12 min.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shot, A.P., M81A1.....	1.96 lb.	.72 lb.	4.72 lb.
Shell, H.E., Mk. II.....	1.93 lb.	.72 lb.	4.69 lb.

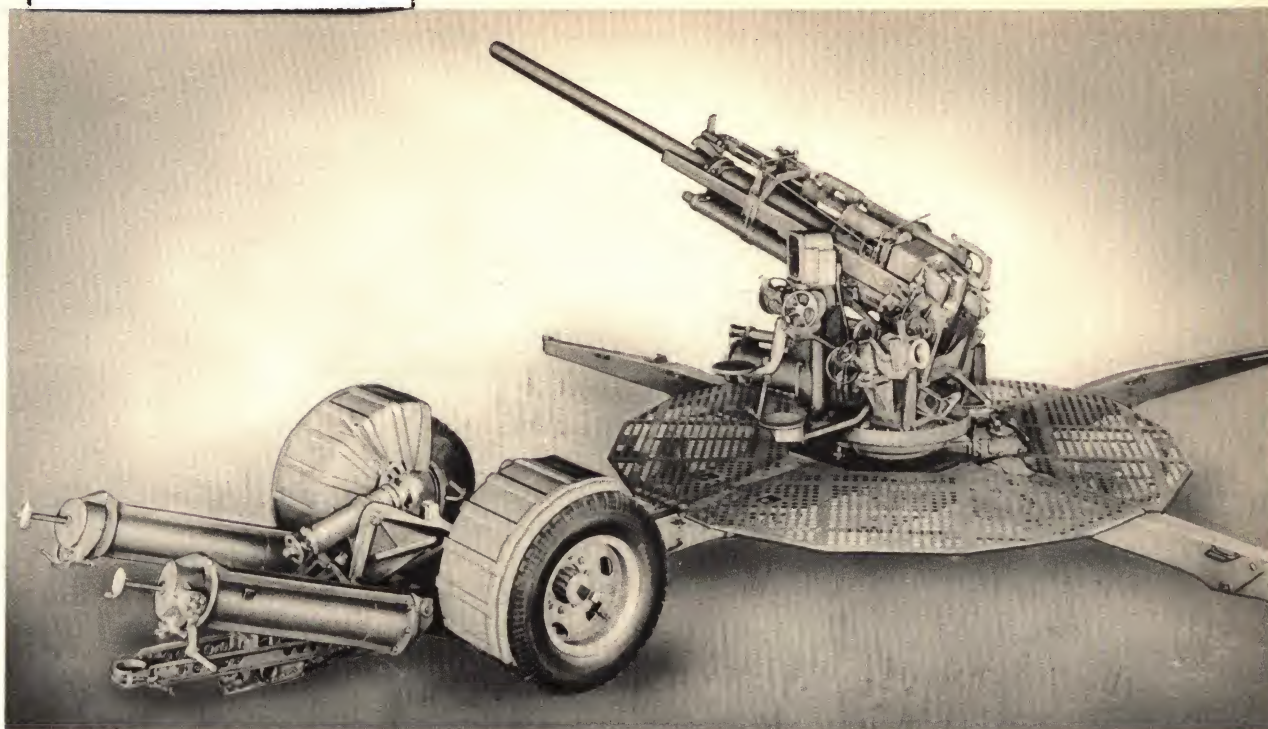
ARMOR PENETRATION—Shot, A.P., M81A1

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2465	2.3	1.9	2.1	1.8
1000	2130	1.8	1.6	1.7	1.5
1500	1820	1.4	1.2	1.4	1.2
2000	1540	1.1	1.0	1.1	0.9

CHARACTERISTICS

Weight of gun and carriage in traveling position.....		5,905 lb.
Muzzle velocity {	Shot, A.P., M81A1.....	2,870 f/s
	Shell, H.E., Mk. II.....	2,870 f/s
Maximum range {	Shot, A.P., M81A1.....	9,475 yds.
	Shell, H.E., Mk. II.....	Horizontal 10,859 yds.,* Vertical 7,625 yds.*

*Maximum theoretical range. Self-destroying element destroys projectile after 15 seconds time of flight.



90 mm Gun M1 on Carriage M1A1—in firing position

90 MM GUNS, M1 AND M1A1 ON 90 MM ANTIAIRCRAFT GUN MOUNT M1A1

The 90 mm Guns, M1 and M1A1, developed primarily for long-range antiaircraft use, can also be used effectively against tanks and other ground targets. The M1 is hand loaded, while the M1A1 employs a spring rammer.

The mount is provided with a single-axle, dual wheeled bogie and is drawn by the trail. To place the gun in firing position, the outriggers are spread, the bogie is removed, and the mount is lowered to the ground until it rests on the pedestal base. Direct or indirect fire can be used against aircraft, the gun being elevated and traversed automatically by remote control, or manually by means of a "match-the-pointer" system. When used against terrestrial targets, direct fire sights are employed and the weapon is elevated and traversed by hand.

Ammunition used in this weapon against surface targets includes Projectile, A.P.C., M82 and the Shell, H.E., M71.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M71 . . .	23.4 lb.	7.31 lb.	42.04 lb.
Projectile, A.P.C., M82	24.11 lb.	7.31 lb.	42.75 lb.

ARMOR PENETRATION—Projectile, A.P.C., M82

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2,530	5.9 in.	4.7 in.	6.4 in.	5.0 in.
1,000	2,410	5.5 in.	4.4 in.	6.0 in.	4.6 in.
2,000	2,170	4.7 in.	3.8 in.	5.2 in.	4.0 in.
3,000	1,940	4.0 in.	3.2 in.	4.4 in.	3.4 in.
4,000	1,720	3.4 in.	2.7 in.	3.7 in.	2.8 in.
5,000	1,520	2.8 in.	2.3 in.	3.1 in.	2.4 in.
6,000	1,340	2.4 in.	1.9 in.	2.6 in.	2.0 in.

CHARACTERISTICS

	Gun M1 on Mount M1A1	Gun M1A1 on Mount M1A1
Weight of gun and mount in traveling position	17,714 lb.	19,000 lb.
Muzzle Velocity {	Shell, H.E., M71	2,700 f/s
	Projectile, A.P.C., M82	2,670 f/s
Maximum Range {	Horizontal	Horizontal
	Vertical	Vertical
Elevation	Shell, H.E., M71	18,980 yd.
	Projectile, A.P.C., M82	18,540 yd.
Traverse		—5° to +80°
How fired		360°
Rate of fire		Wheels off
Time to emplace {	with fire control equipment	22 rds. per min.
	without fire control equipment	30 min.
		7 min.



90 mm Gun M2 on Mount M2—in traveling position

90 MM GUN M2 ON 90 MM ANTI-AIRCRAFT GUN MOUNT M2

The 90 mm Gun M2, like the M1 and M1A1, is designed primarily for anti-aircraft use, but also may be employed against tanks and ground targets. The rate of fire with the automatic power driven fuze-setter rammer is from 20 to 24 rounds per minute. When firing against mechanized targets, time-fuzed ammunition is not employed and the fuze setting mechanism of the fuze-setter rammer is disconnected.

The 90 mm Anti-aircraft Gun Mount M2 has a great advantage over the M1A1 mounts in that it may be fired from the wheels in an emergency. When the gun is fired from the wheels, electric power is not normally available, hence the fuze setter rammer is not used.

Against aircraft, direct or indirect fire may be used with automatic elevation and traverse of the weapon by remote control. For direct fire against tanks, Sighting System M7 is used and the gun is elevated and traversed manually.

CHARACTERISTICS

Weight of gun and mount in traveling position		32,300 lb.
Muzzle velocity	Shell, H.E., M71	2,700 f/s
	Projectile, A.P.C., M82	2,670 f/s
Maximum range	Shell, H.E., M71	Horizontal 19,500 yd.
	Projectile, A.P.C., M82	Vertical 13,170 yd.
		18,540 yd.

Elevation.....	—10° to +80°
Traverse.....	360°
How fired.....	From wheels or pedestal
Rate of fire.....	25 rds. per min.
Time to emplace {	with fire control equipment.. 30 min.
	without fire control equipment..... 3 min. to fire from wheels

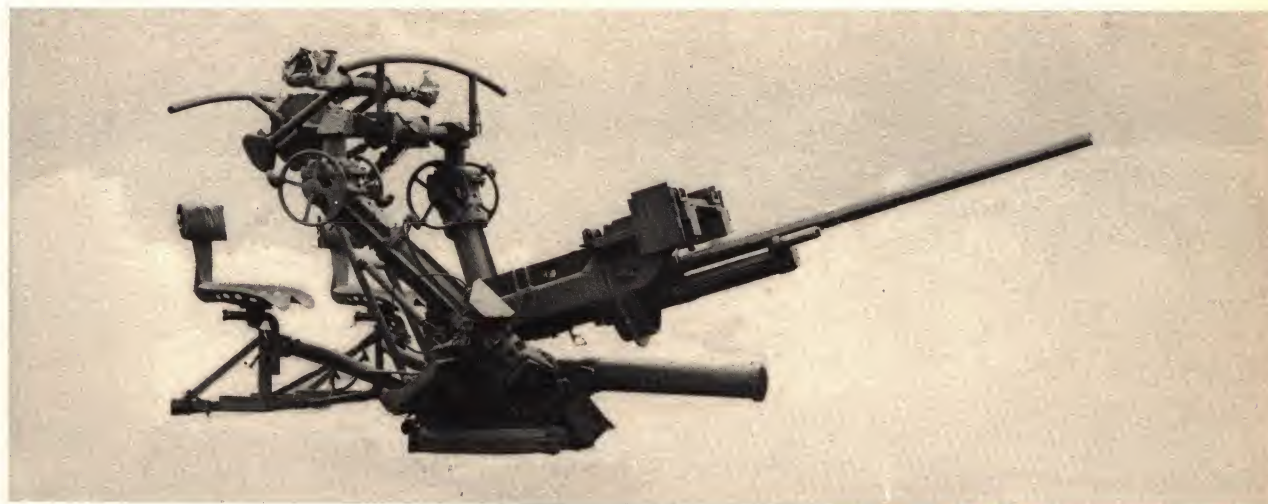
AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M71 with standard fuze	23.4 lb.	7.31 lb.	42.04 lb.
Projectile, A.P.C., M82	24.11 lb.	7.31 lb.	42.75 lb.

ARMOR PENETRATION—Projectile, A.P.C., M82

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2,530	5.9 in.	4.7 in.	6.4 in.	5.0 in.
1,000	2,410	5.5 in.	4.4 in.	6.0 in.	4.6 in.
2,000	2,170	4.7 in.	3.8 in.	5.2 in.	4.0 in.
3,000	1,940	4.0 in.	3.2 in.	4.4 in.	3.4 in.
4,000	1,720	3.4 in.	2.7 in.	3.7 in.	2.8 in.
5,000	1,520	2.8 in.	2.3 in.	3.1 in.	2.4 in.
6,000	1,340	2.4 in.	1.9 in.	2.6 in.	2.0 in.

TANK GUNS



37 mm Automatic Gun M1A2—on Mount M54

37 MM GUN M1A2

The 37 mm Gun M1A2 is primarily an anti-aircraft weapon, but when it is mounted on the Multiple Gun Motor Carriage M15 or the Combination Gun Motor Carriage M15A1 it can also be used to advantage against tanks. This fully automatic weapon has a high rate of fire. Provisions are made for direct fire only. When firing over the cab of the motor gun carriage depression of the weapon is limited to 20°.

PRINCIPAL CHARACTERISTICS

Weight of gun.....	365 lb.
Length of tube.....	78 in.
Muzzle velocity { Shot, A.P.C., M59A1.....	2,050 f/s
Shell, H.E., M54.....	2,600 f/s
Maximum rate of fire.....	120 rds. per min.
Elevation.....	0° to +85° (on M15) -5° to +85° (on M15A1)
Traverse.....	360°

Maximum range { Shot, A.P.C., M59A1.....	5,790 yds.
Shell, H.E., M54.....	8,875 yds.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shot, A.P.C., M59A1.....	1.91 lb.	.33 lb.	3.39 lb.
Shell, H.E., M54....	1.34 lb.	.39 lb. (M1 powder)	2.68 lb. w. M1 powder
		.29 lb. (M2 & M5 powder)	2.58 lb. w. M2 & M5 powder

ARMOR PENETRATION—Shot, A.P.C., M59A1

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	1380	1.1	.9	1.0	.8
1000	1010	.7	.6	.6	.5



37 mm Gun M6

37 MM GUN M6

The 37 mm Gun M6 constitutes the principal armament of Light Tanks M3A3, M5, M5A1, T9E1 (Airborne) and the Light Armored Car M8. It is similar in characteristics and performance to the 37 mm Antitank Gun M3A1 on the wheeled Carriage M4A1. With A.P.C. projectile it is effective against light armor. When mounted in tanks the gun is elevated manually. Traverse is accomplished by hand except in tanks with power driven turrets. With the sighting equipment now provided only direct fire is possible.

CHARACTERISTICS

Weight (without mount)	190 lb.
Muzzle velocity { Shell, H.E., M63	2,600 f/s
Shot, A.P.C., M51B2	2,900 f/s
Canister, M2	2,500 f/s

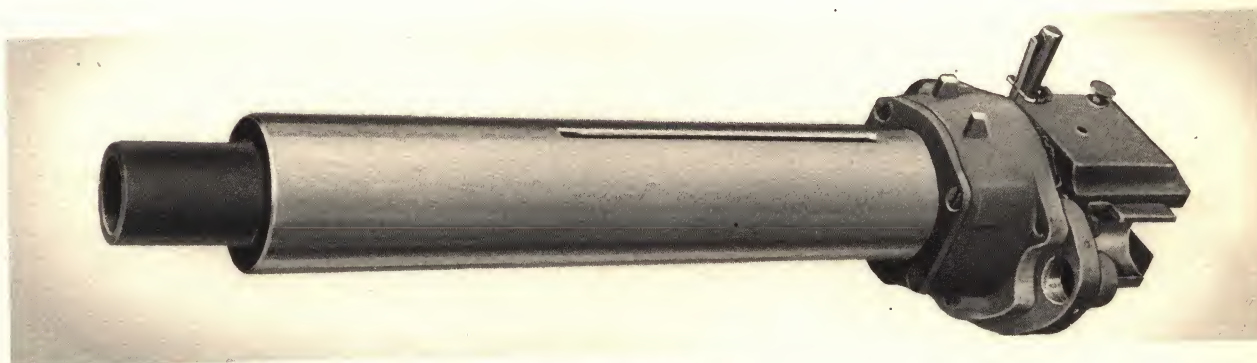
Range permitted at maximum elevation	Maximum Elevation	Shot, A.P.C., M51B1	Shell, H.E., M63
Light Tanks, M3A3, M5, M5A1	-10° to +20°	10,870 yd.	8,000 yd.
Light Tank, T9E1	-10° to +30°	12,000 yd.	9,000 yd.
Light Armored Car, M8	-10° to +20°	10,870 yd.	8,000 yd.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M63	1.61 lb.	0.49 lb.	3.08 lb.
Shot, A.P.C., M51B2	1.92 lb.	0.57 lb.	3.41 lb.
Canister, M2	1.94 lb.	0.52 lb.	3.44 lb.

ARMOR PENETRATION—Shot, A.P.C., M51B2

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		Obliquity 0°	Obliquity 30°	Obliquity 0°	Obliquity 30°
500	2550	2.7 in.	2.2 in.	2.5 in.	1.9 in.
1000	2290	2.3 in.	1.9 in.	2.1 in.	1.7 in.
1500	2100	2.0 in.	1.6 in.	1.9 in.	1.5 in.
2000	1930	1.8 in.	1.5 in.	1.7 in.	1.4 in.
3000	1600	1.4 in.	1.1 in.	1.3 in.	1.0 in.



75 mm Howitzer M3

75 MM HOWITZERS M2 AND M3

The 75 mm Howitzer M2 is the M1A1 pack howitzer modified to permit it to be mounted in the turret of a self-propelled motor carriage. The M3 is a similar weapon but is of new manufacture and not a modified M1A1 Howitzer. The howitzer fires H.E., A.T. ammunition which is very effective against tanks, and an H.E. shell which is used against other ground targets.

The 75 mm howitzer is mounted in the 75 mm Howitzer Mount M7 which rests on trunnions in the turret of the vehicle. Elevation and traverse are accomplished manually. The weapon is provided with sighting and fire control equipment which permits either direct or indirect fire.

PRINCIPAL CHARACTERISTICS

Weight of 75 mm Howitzer, M2	318 lb.
Weight of 75 mm Howitzer, M3	421 lb.
Length of tube	37.15 in.
Maximum rate of fire	25 r.p.m.

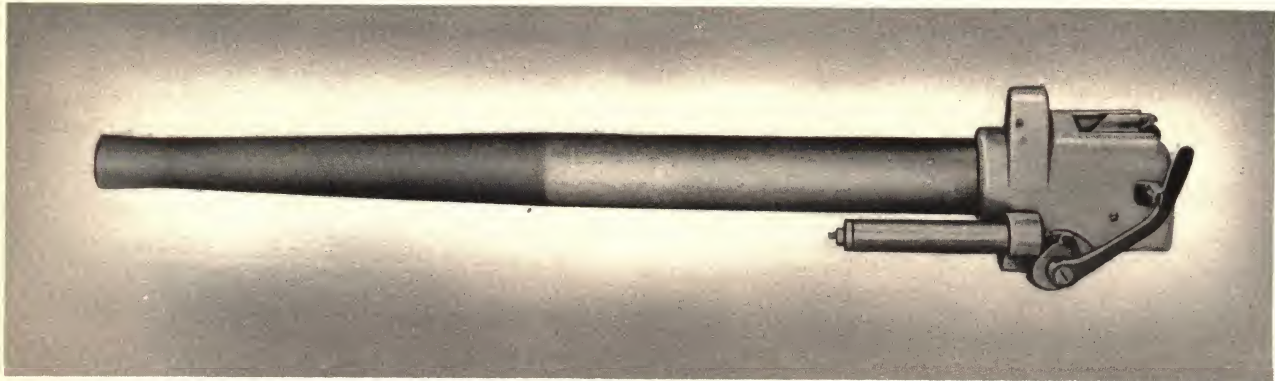
Muzzle velocity	{ Shell, H.E., A.T., M66.....1000 f/s Shell, H.E., M48.....1250 f/s
Elevation-20° to +40°
Traverse360°
Range permitted by maximum elevation	{ Shell, H.E., A.T., M66 7,670 yd. Shell, H.E., M48.....9,500 yd.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., A.T., M66	13.37 lb.	.41 lb.	16.30 lb.
Shell, H.E., M48	14.70 lb.	.92 lb.	17.67 lb.

ARMOR PENETRATION—75 mm Shell, H.E., A.T., M66

For both face hardened and homogeneous plate the penetration is between 3 and 4 inches at all angles of armor inclination from 0° to 60° at all ranges at which it is possible to hit the target.



75 mm Gun M3

75 MM GUN M3

The 75 mm Gun M3 is the principal armament of the medium tanks of the M4 series, except the M4A5 which mounts a 75 mm gun instead. The M3 Gun fires A.P.C. and H.E. ammunition. The A.P.C. round is an effective projectile against tanks.

The gun is a single-shot weapon, and is mounted with a cal. .30 machine gun in Combination Gun Mount M34A1. The weapon is loaded manually, and may be fired either manually or by a solenoid. Elevation is manual and traverse of the gun and turret may be accomplished either manually or by hydraulic power.

Sighting equipment for either direct or indirect fire is provided, but direct fire is chiefly used against tanks.

PRINCIPAL CHARACTERISTICS

Weight of gun.....	910 lb.
Maximum rate of fire.....	20 r.p.m.
Muzzle velocity {	
Projectile, A.P.C., M61 or M61A1.....	2,030 f/s
Shell, H.E., M48.....	1,980 f/s

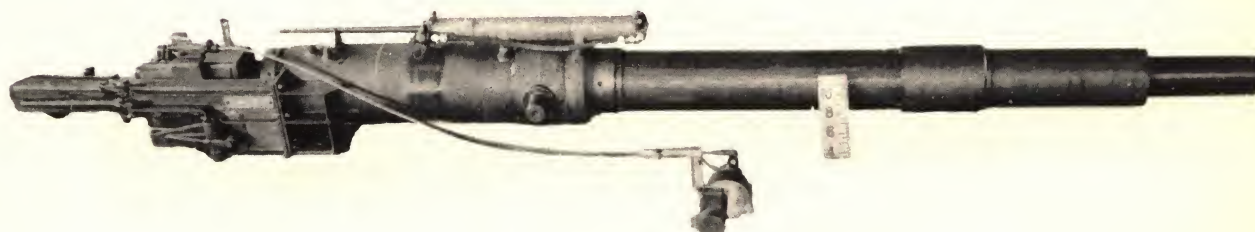
Elevation.....	-12° to +25°
Traverse.....	360°
Range permitted by maximum elevation {	
Projectile, A.P.C., M61 or M61A1.....	11,800 yd.
Shell, H.E., M48.....	11,500 yd.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Projectile, A.P.C., M61 or M61A1.....	14.96 lb.	2.16 lb.	20.02 lb.
H.E., M48.....	14.70 lb.	2.16 lb.	19.59 lb.

ARMOR PENETRATION—Projectile, A.P.C., M61 or M61A1

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	1,900	3.3 in.	2.6 in.	4.0 in.	3.1 in.
1,000	1,770	3.0 in.	2.4 in.	3.6 in.	2.8 in.
2,000	1,530	2.4 in.	1.9 in.	2.9 in.	2.3 in.
4,000	1,130	1.6 in.	1.3 in.	1.9 in.	1.5 in.
6,000	940	1.2 in.	1.0 in.	1.5 in.	1.1 in.



75 mm Tank Gun M5

75 MM GUN M5

The 75 mm Gun M5, originally developed as an aircraft gun, also forms the principal armament of Light Tank, M24. When mounted in the tank, the maximum recoil of the gun is held to 12 inches. The weapon fires A.P.C. and H.E. ammunition, of which only the A.P.C. is effective against tanks.

This light-weight, single-shot weapon and its concentric recoil mechanism are mounted with a cal. .30 machine gun in Combination Gun Mount, M64. Sighting equipment for direct and indirect fire is supplied.

PRINCIPAL CHARACTERISTICS

Weight of gun.....	406 lb.
Length of gun.....	110.7 in.
Maximum rate of fire.....	20 r.p.m.
Muzzle velocity {	
Projectile, A.P.C., M61 or	2,030 f/s
M61A1.....	1,980 f/s
Shell, H.E., M48.....	
Elevation.....	-10° to +15°

Traverse.....	360°
Range permitted by maximum elevation {	
Projectile, A. P. C., M61 or	9,000 yd.
M61A1.....	
Shell, H.E., M48.....	8,700 yd.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Projectile, A.P.C.,			
M61 or M61A1.....	14.96 lb.	2.16 lb.	20.02 lb.
H.E., M48.....	14.70 lb.	2.16 lb.	19.59 lb.

ARMOR PENETRATION—A.P.C., M61 or M61A1

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	1,900	3.3 in.	2.6 in.	4.0 in.	3.1 in.
1,000	1,770	3.0 in.	2.4 in.	3.6 in.	2.8 in.
2,000	1,530	2.4 in.	1.9 in.	2.9 in.	2.3 in.
4,000	1,130	1.6 in.	1.3 in.	1.9 in.	1.5 in.
6,000	940	1.2 in.	1.0 in.	1.5 in.	1.1 in.



76 mm Gun M1A1. The M1A2 is similar, but is threaded at the muzzle for a muzzle brake.

76 MM GUNS M1A1 AND M1A2

The 76 mm Guns M1A1 and M1A2 were developed to provide more powerful, higher velocity, longer range weapons for tanks than the 75 mm gun. 76 mm Guns, M1A1 and M1A2, form the principal armament of the 76 mm Gun Motor Carriage M18 and Medium Tanks, M4 series (76 mm). H.E. and A.P.C. ammunition are provided for the weapon.

The M1A1 and M1A2 guns differ only in the twist of the rifling and in the fact that the M1A2 is threaded at the muzzle to allow assembly of a muzzle brake. M1A1 guns threaded for a muzzle brake are designated M1A1C. A ring is furnished to cover the threads when the muzzle brake is not in place.

Direct or indirect fire may be used with this weapon.

PRINCIPAL CHARACTERISTICS

Weight of gun	1,204 lb.
Length of gun	163.75 in.
Muzzle velocity	Projectile, A.P.C., M62 or M62A1 2,600 f/s Shell, H.E., M42A1 2,700 f/s
Rate of fire	20 r.p.m.
Traverse	360°

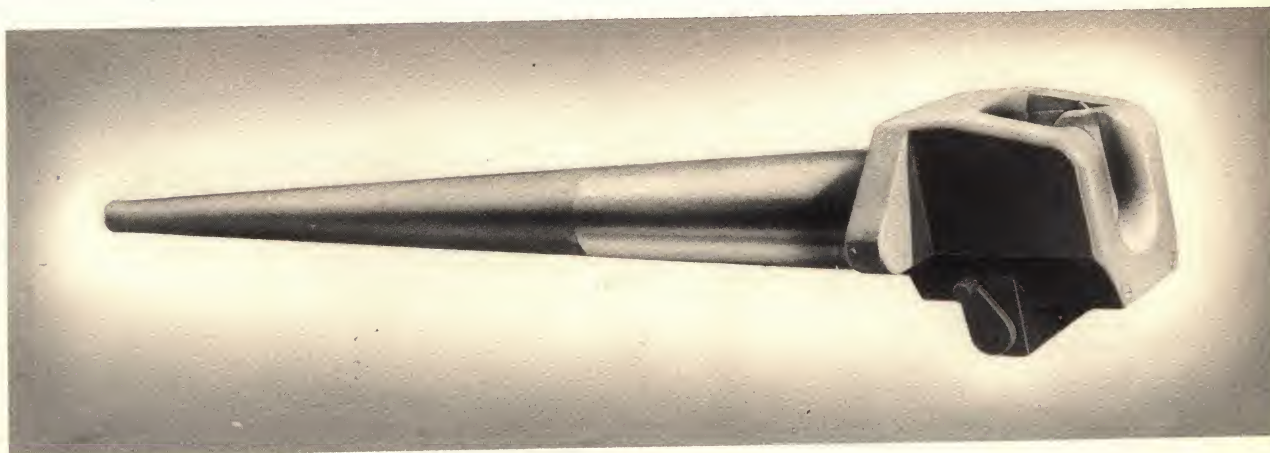
Elevation	-10° to +20° (G.M.C., M18) -10° to +25° (M.T.)
Range permitted by maximum elevation	Projectile, A.P.C., M62 or M62A1 76 mm Gun Motor Carriage M18 13,160 yd. Medium Tank (M4 Series) 14,390 yd.
Range permitted by maximum elevation	Shell, H.E., M42A1 76 mm Gun Motor Carriage M18 11,800 yd. Medium Tank (M4 Series) 12,900 yd.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Projectile, A.P.C., M62 or M62A1	15.44 lb.	3.63 lb.	24.67 lb.
Shell, H.E., M42A1	12.87 lb.	3.63 lb.	22.05 lb.

ARMOR PENETRATION—Projectile, A.P.C., M62 or M62A1

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2,450	4.9 in.	3.9 in.	5.1 in.	4.1 in.
1,000	2,300	4.5 in.	3.6 in.	4.7 in.	3.8 in.
2,000	2,000	3.7 in.	2.9 in.	3.9 in.	3.1 in.
4,000	1,460	2.3 in.	1.9 in.	2.5 in.	2.0 in.



3-inch Gun M7

3-INCH GUN M7

The 3-inch gun M7 is almost identical with the 3-inch Antitank Gun M5. It uses the same ammunition as does the 3-inch antitank guns and has the same effect against armor plate.

The weapon is mounted on the Gun Mount M5, which consists of a cradle, elevating mechanism, recoil cylinders, mechanical firing mechanism, electrical firing mechanism, and operating crank ejector mechanism. The gun and mount rest on trunnions in the open-top turret. Elevation of the gun and traverse of the turret are accomplished manually. Either direct or indirect fire may be used with the 3-inch Gun M7.

PRINCIPAL CHARACTERISTICS

Weight of gun.....	1,990 lb.
Length of tube.....	158.1 in.
Muzzle velocity { Projectile, A.P.C., M62 or M62A1	2600 f/s
Shell, H.E., M42A1	2800 f/s
Rate of fire.....	15 rds. per min.

Elevation.....	-10° to +30°
Traverse.....	360°
Range permitted by maximum elevation { Projectile, A.P.C., M62 or M62A1	13,160 yd.
Shell, H.E., M42A1	15,900 yd.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Projectile, A.P.C., M62 or M62A1	15.44 lb.	4.63 lb.	27.23 lb.
Shell, H.E., M42A1	12.87 lb.	4.57 lb.	24.91 lb.

ARMOR PENETRATION—Projectile, A.P.C., M62 or M62A1

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2,450	4.9 in.	3.9 in.	5.1 in.	4.1 in.
1,000	2,300	4.5 in.	3.6 in.	4.7 in.	3.8 in.
2,000	2,000	3.7 in.	2.9 in.	3.9 in.	3.1 in.
4,000	1,460	2.3 in.	1.9 in.	2.5 in.	2.0 in.



90 mm Tank Gun M3

90 MM GUN M3

The 90 mm Gun M3 is basically the same as the 90 mm Gun M1 to permit its being mounted in armored vehicles. It uses the same ammunition as the basic gun and has the same performance against tanks and ground targets.

It is mounted in the 90 mm Gun Motor Carriage where it is provided with vision and sighting devices for direct fire and instruments for indirect fire.

PRINCIPAL CHARACTERISTICS

Weight of gun.....	2,260 lb.
Length of gun.....	186.15 in.
Muzzle velocity {	
Projectile, A.P.C., M82.....	2,670 f/s
Shell, H.E., M71.....	2,700 f/s
Rate of fire.....	15-20 rds. per min.
Elevation.....	-10° to +20°
Traverse.....	360°

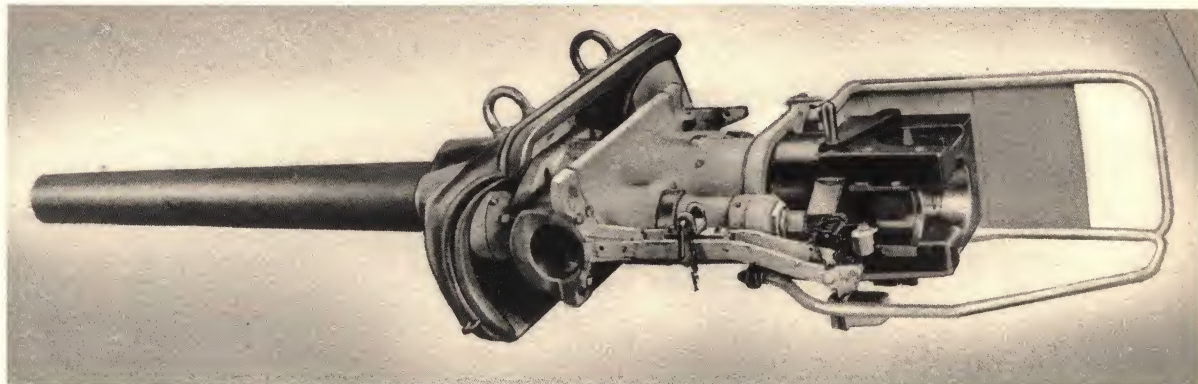
Range permitted by maximum elevation	Projectile, A.P.C., M82.....	15,260 yd.
	Shell, H.E., M71.....	13,000 yd.

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M71			
with standard fuze.	23.4 lb.	7.31 lb.	42.04 lb.
Projectile, A.P.C., M82.....	24.11 lb.	7.31 lb.	42.75 lb.

ARMOR PENETRATION—Projectile, A.P.C., M82

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2,530	5.9 in.	4.7 in.	6.4 in.	5.0 in.
1,000	2,410	5.5 in.	4.4 in.	6.0 in.	4.6 in.
2,000	2,170	4.7 in.	3.8 in.	5.2 in.	4.0 in.
3,000	1,940	4.0 in.	3.2 in.	4.4 in.	3.4 in.
4,000	1,720	3.4 in.	2.7 in.	3.7 in.	2.8 in.



105 mm Howitzer M4 and Combination Gun Mount M52

105 MM HOWITZER M4

To permit turret mounting of the 105 mm Howitzer M2A1 in the M4-type Medium Tank, the weapon has been modified as the 105 mm Howitzer M4. The M4 uses the same ammunition and has the same ballistic characteristics as the M2A1 howitzer. Together with a caliber .30 machine gun, the 105 mm Howitzer M4 is mounted in Combination Gun Mount M52. Elevation and traverse are accomplished manually. Provisions for direct and indirect fire are provided.

PRINCIPAL CHARACTERISTICS

Weight of gun.....1,140 lb.
 Length of gun.....93 in.
 Muzzle velocity { H.E. Shell, M1.....1,550 f/s
 H.E., A.T. Shell, M67..1,250 f/s
 Rate of fire.....4 rds. per min.—short burst
 2 rds. per min.—prolonged
 Elevation.....-10° to +35°

Traverse.....360°
 Range permitted by maximum elevation { Shell, H.E., M1.....11,700 yd. (charge 7)
 Shell, H.E., A.T., M67.....8,300 yd.

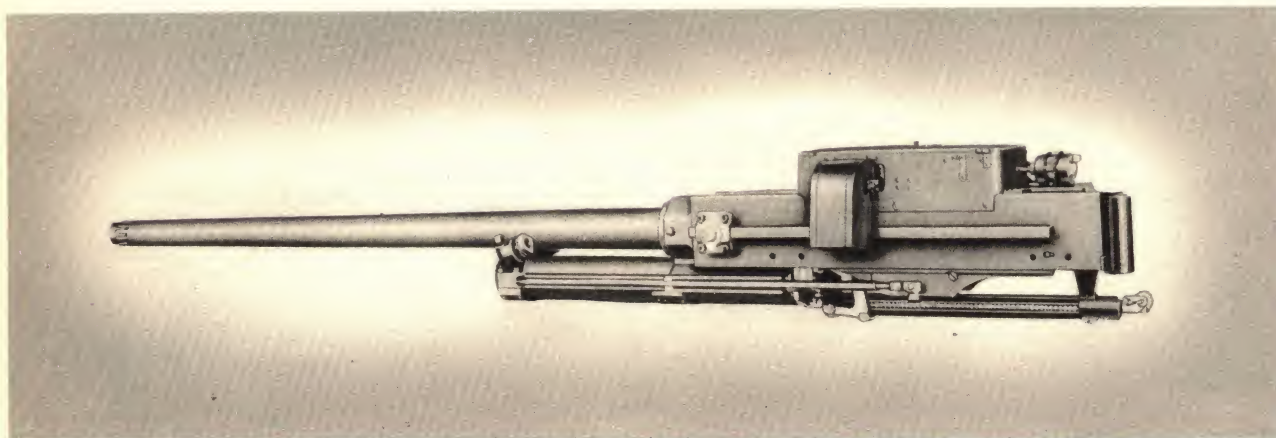
AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shell, H.E., M1	33.00 lb.	2.94 lb.	42.07 lb.
Shell, H.E., A.T., M67	29.22 lb.	1.5 lb.	36.95 lb.

ARMOR PENETRATION—Shell, H.E., A.T., M67

For both homogeneous and face hardened plate the penetration is better than 4" at all angles of armor inclination from 0° to 60° at which it is possible to hit the target.

AIRCRAFT ARMAMENT



37 mm Automatic Gun AN-M9

37 MM AUTOMATIC GUN AN-M9

This gun is a fully automatic aircraft weapon firing high-explosive and armor-piercing projectiles at a rate of 140 rounds per minute. It is an effective plane-to-ground and plane-to-plane weapon. Designed for aircraft use against tanks, it should be employed in conjunction with machine guns mounted in the airplane. Bullets splash from Caliber .50 machine guns will enter extremely small openings in tank hulls and spray within the tank at right angles to the point of entry with lethal effect. Machine gun bullets striking between the hull and turret may result in jamming the turret. The AN-M9 may be mounted in the propeller shaft or in the wings. It is fired electrically by remote control.

CHARACTERISTICS

Weight of gun.....398 lb.

Length of gun (overall).....104 in.

Muzzle velocity	{	Shot, A.P., 37 mm,	
		M80.....	3050 f/s
		Shell, H.E., 37 mm,	
		M54.....	2600 f/s
		Shot, A.P.C.,	
		37 mm, M59A1...	2800 f/s

Rate of fire.....140 rds. per min.

Length of recoil.....10.75 in.

Breechblock.....Vertical sliding wedge

Recoil mechanism.....Hydrospring

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
Shot, A.P., M80.	1.66 lb.	.57 lb.	3.18 lb.
Shell, H.E., M54.	1.34 lb.	.29 lb. (M5)	2.58 lb. (w/M5 pwdr.)
		.39 lb. (M1)	2.68 lb. (w/M1 pwdr.)
Shot, A.P.C., M59A1.....	1.91 lb.	.52 lb.	3.39 lb.

ARMOR PENETRATION—Shot, A.P., M80

Muzzle Velocity-3,560 f/s *

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2,900	3.5 in.	2.8 in.	2.9 in.	2.5 in.
1,000	2,330	2.6 in.	2.1 in.	2.2 in.	1.9 in.

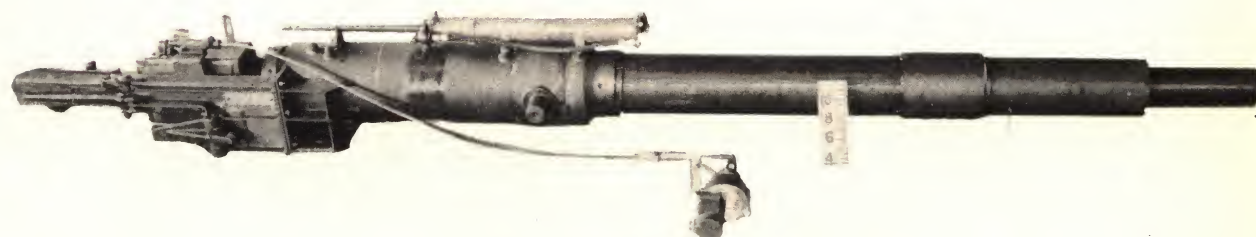
*3050 f/s + 350 m.p.h. airspeed

ARMOR PENETRATION—Shot, A.P.C. M59A1

Muzzle Velocity-3,315 f/s *

Range Yards	Striking Velocity f/s	Homogeneous Plate		Face Hardened Plate	
		0° Obliquity	30° Obliquity	0° Obliquity	30° Obliquity
500	2,390	2.5 in.	2.0 in.	2.3 in.	1.8 in.
1,000	1,640	1.5 in.	1.2 in.	1.3 in.	1.1 in.

*2800 f/s + 350 m.p.h. airspeed



75 mm Aircraft Gun AN-M5

75 MM AIRCRAFT GUN AN-M5A1

The 75 mm Aircraft Gun AN-M5A1 is a specially designed light weight weapon for aircraft installation on the mount M9. The gun is hand-loaded and capable of firing approximately ten rounds per minute. Firing is accomplished electrically by a solenoid which becomes energized when the firing switch is closed. The gun is 37.5 calibers in length and has a vertical sliding wedge type breech mechanism. The breech mechanism is opened manually for the first round and closed by the action of the projectile tripping the sears and allowing the breech to close under pressure of the closing spring. During counter-recoil, the breech mechanism is opened automatically by action of the breech operating crank as it strikes the breech operating cam on the mount. A collar on the forward end of the gun tube retains the counter-recoil spring. Since the M9 is a fixed mount it is necessary to aim the gun by directing the plane at the target.

The M9 mount has a hydrospring concentric type recoil mechanism, with the cradle forming the outer cylinder of the mechanism.

When this gun is used against tanks it is advisable to fire the airplane machine guns in conjunction with it to obtain the effect possible from bullet splash of the smaller ammunition.

CHARACTERISTICS

Weight of gun and mount..... 759 lb.
 Length (muzzle to rear face of breech ring) 116.4 in.
 Muzzle velocity { Shell, H.E., 75 mm, M48 (supercharged) 1,980 f/s
 Projectile, A.P.C., 75 mm, M61A1 (supercharged).... 2,030 f/s
 Rate of fire..... 10 rds. per min.
 Length of recoil..... 23 in. (max.)
 Breechblock..... Vertical sliding
 Recoil mechanism..... Concentric hydrospring

AMMUNITION

Type	Wt. of Projectile	Wt. of Powder Charge	Wt. of Complete Round
M48.....	14.70 lb.	1.93 lb.	19.59 lb.
M61A1.....	14.96 lb.	2.11 lb.	20.02 lb.

ARMOR PENETRATION—Projectile, A.P.C., M61A1

M.V.—2,545 f/s*

Range Yards	Striking Velocity f/s	Homogeneous Plate 30°		Face Hardened Plate 30°	
		Obliquity	Obliquity	Obliquity	Obliquity
500	2405	4.6 in.	3.6 in.	5.5 in.	4.4 in.
1000	2260	4.2 in.	3.4 in.	5.0 in.	4.0 in.
2000	1985	3.5 in.	2.8 in.	4.1 in.	3.3 in.
4000	1485	2.3 in.	1.8 in.	2.8 in.	2.2 in.

*2030 f/s + 350 m.p.h. airspeed